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EXAMINER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *3/22/04* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date *3/22/04*.

4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Claim Objections

1.   **Claims 1 and 15** are objected to because of the following informalities: Claims 1

and 15 require only one of the enumerated steps ("...comprising at least one of

steps..."). However, the final limitation in each claim requires all steps to be performed

("wherein steps a) – c) are performed"). These two requirements are incompatible.

Because finding only a single step of both claim sis trivial, for the purposes of this

examination the words "at least one of" will be omitted so as to require all steps to be a

part of the claim.   Appropriate correction is required.

Claim Rejections - 35 USC § 112

2.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

3.   **Claim 9** recites the limitation " a time between said first and second images".

There is insufficient antecedent basis for this limitation in the claim. Claim 1 makes no

reference to time between images, even though it is taught that the images are taken at

different times.

4.   **Claim 9** is rejected under 35 U.S.C. 112, second paragraph, as being incomplete

for omitting essential elements, such omission amounting to a gap between the

elements. See MPEP § 2172.01. The omitted elements are: Claim 9 relates a time

directly to distance, without mentioning speed. It is not taught how the camera is

moving, making a relationship between time and distance ambiguous. Correction is

required.

Claim Rejections - 35 USC § 101

5.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6.   **Claims 1, 4, 6-10, and 15-20** are rejected under 35 U.S.C. 101 as being directed

to non-statutory subject matter because the claimed invention is directed to a judicial

exception and is not directed to a practical application of such judicial exception.

MPEP Section 2106 (IV)(C)(2)(b)(2) titled "Tangible Result" reads as follows:

> The tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing. However, the tangible requirement does require that the claim must recite more than a 35 U.S.C. 101 judicial exception, in that the process claim must set forth a practical application of that judicial exception to produce a real-world result. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77 (invention ineligible because had "no substantial practical application.").

The method of claim 1 lacks practical application. The steps of the method

include "ascertaining" and "determining". There is no tangible or practical result of

"ascertaining" or "determining", the data is not used in any way. The end result is some

data being determined to be of interest, however nothing operates on that data nor is it

used in another method. Claims 4 and 6-10 do not add any limitations that satisfy the

tangibility requirement. Claims 4 and 6-8 provide methods of identifying image points,

which does not constitute practical application. Claims 9-10 elaborate on the difference

between the two images, not adding any practical application.

Claim 15 is rejected on similar grounds. The steps of the method of claim 15 do

not satisfy the tangibility requirement. The end result is data being determined to be of

interest, however there is no result of this determination. Claims 16-20 similarly do not

provide a practical application of the method to satisfy the tangibility requirement.

Claims 2, 3, 5, and 11-14 satisfy 35 U.S.C. 101 by incorporating a hardware

element to the method. It should be noted, however, that this is not the only way to

satisfy the tangibility requirement. The tangibility requirement does not reflect the

common meaning of the word "tangible". The tangibility requirement can be satisfied by

any practical application of a method, for example modifying image data even though

that image data is not itself tangible.

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2.   **Claims 1-9, and 11-12** are rejected under 35 U.S.C. 102(b) as being anticipated

by Kawabata (US 2001/0033702 A1).

Regarding **claim 1**, Kawabata teaches a method of increasing resolution in a

camera ("single enhanced image", Paragraph 27), comprising steps a)-c):

a) ascertaining a pixel location in a first image for each of a plurality of identifiable image points, wherein a first particular identifiable image point among said plurality of identifiable image points is located in a first pixel in said first image (Figure 7 Step 706, "Select Pixel Region (A) From First File");

b) ascertaining a pixel location in a second image for each of said plurality of identifiable image points (Figure 7 Step 708, "Select Pixel Region (C) From Second File"); and

c) determining a first region within said first pixel, said first region smaller than said first pixel, in which said first particular identifiable image point is located, based at least in part on the ascertained pixel locations of said plurality of identifiable image points in said first and second images (Figure 7 steps 710-736 aligns the image based on the two image points; and Figure 11 demonstrates subpixel alignment),

wherein steps a) - c) are performed.

Regarding **claim 2**, Kawabata teaches a computer (Figure 1, Computer 120) inherantly containing a computer readable medium to carry out the method of claim 1.

Regarding **claim 3**, Kawabata teaches a camera system that performs the method of claim 1 (in figure 1, Light source 110, lens 106, and image sensor 102 comprise a camera).

Regarding **claim 4**, Kawabata teaches the method as in claim 1, further

comprising:

providing said first image of an object having a plurality of identifiable object

points (Figure 7 Step 702); and

providing said second image of said object different from and subsequent to said

first image (Figure 7 Step 704),

wherein said plurality of identifiable image points in said first and second images correspond to said identifiable object points ("area A or B is encompass within the same pixel identification range as the other area A or B", Paragraph 57).

Regarding **claim 5**, Kawabata teaches the method as in claim 1, further comprising at least one of priming and displaying said first image with said first particular identifiable image point located in said first region ("Once the images have been aligned and combined, the final digital representation may be viewed on a video monitor associated with a computer, or printed on a printer connected to computer", Pargraph 50).

Regarding **claim 6**, Kawabata teaches the method as in claim 1, wherein step a) comprises ascertaining said pixel location in said first image at least in part by an edge-finding technique ("C can be moved one pixel at a time in the horizontal direction until it reaches the edge of B", Paragraph 70).

Regarding **claim 7**, Kawabata teaches the method as in claim 1, further comprising identifying said plurality of identifiable image points in said first image at least in part by point differentiation, whereby an identifiable image point is identified by differentiating said identifiable image point from other points in said first image on the basis of at least one of: absolute position in the first image; relative position compared to said other points; color; and magnitude/brightness ("differences in film grain can

cause slight differences in the pixel data 504 which is recorded for that blue sky",

Paragraph 54).

Regarding **claim 8**, Kawabata teaches the method as in claim 1, wherein step b)

comprises ascertaining said pixel location in said second image for each of said plurality

of identifiable image points at least in part by point tracking, whereby a second pixel

location in said second image of an identifiable image point is ascertained at least by:

selecting a group of points in said second image within a predetermined proximity to a

first pixel location in said first image of said identifiable image point; and ascertaining

said second pixel location of said identifiable image point within said group based at

least in part on a best fit analysis (Figure 7 steps 708-726 uses predetermined regions

to start a best fit correlation).

Regarding **claim 9**, Kawabata teaches the method as in claim 1, wherein a time

between said first and second images is shorter than an expected time for a separation

distance between two located identifiable image points to change by at least one pixel

("the second file deviates by one pixel in the X direction", Paragraph 44).

Regarding **claim 11**, Kawabata teaches the method as in claim 9, further

comprising providing a camera configured to create said first and second images (in

figure 1, Light source 110, lens 106, and image sensor 102 comprise a camera),

wherein the expected time is based at least in part on at least one of a focal distance of

said camera and a distance from said camera to an object imaged in said first image

(distances between 102, 106, and 114, figure 1).

Regarding **claim 12**, Kawabata teaches the method as in claim 1, further

comprising: providing a camera configured to create said first and second images (in

figure 1, Light source 110, lens 106, and image sensor 102 comprise a camera); and

moving said camera between a creating of said first and second images, whereby at

least some of said pixel locations in said second image differ from said pixel locations in

said first image ("an image alignment method and system for aligning two digital images

which were intended to be scanned from the same portion of film, but which may be

skewed somewhat due to movement of the film", Paragraph 27).

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

4.   **Claims 10, 13, and 14** are reject under 35 U.S.C. 103(a) as being unpatentable

over Kawabata (US 2001/0033702 A1) in view of Yamada et al. (US 5,754,226).

Regarding **claim 10**, Kawabata teaches claim 9.

Kawabata does not teach claim 9 wherein motion is induced via hand motion.

Yamada teaches the method as in claim 9, wherein the expected time is based at least in part on a natural human movement of a person imaged in said first image ("In addition, since each of (N-1) images is imaged at a different point of time from the time when the reference image is imaged, the image is shifted in the case where a subject moves or an imaging apparatus moves due to movement of a hand holding the apparatus", Yamada Column 7 Line 50).

It would have been obvious at the time of invention to one of ordinary skill in the art to accommodate for human hand movement as taught by Yamada because all hand held cameras are subject to this motion.

Regarding **claim 13**, Kawabata teaches claim 12.

Kawabata does not teach a hand held camera.

Yamada teaches the method as in claim 12, wherein said camera is configured to be hand-held, and said moving is based at least in part on a natural unsteadiness of a human hand ("In addition, since each of (N-1) images is imaged at a different point of time from the time when the reference image is imaged, the image is shifted in the case where a subject moves or an imaging apparatus moves due to movement of a hand holding the apparatus", Yamada Column 7 Line 50).

It would have been obvious at the time of invention to one of ordinary skill in the art to accommodate for human hand movement as taught by Yamada because all hand held cameras are subject to this motion.

Regarding **claim 14**, Kawabata teaches claim 12.

Kawabata does not teach a motion generator to create two slightly different images.

Yamada teaches the method as in claim 12, wherein said camera comprises a motion generator, and wherein said moving is based at least in part on a motion by said motion generator (Yamada Figure 1 shows "Actuator" 5).

It would have been obvious at the time of invention to one of ordinary skill in the art to provide the image capture device of Kawabata with the motion generator of Yamada to generate slightly different images of a scene ("the data from the two images reflects a non-uniformity", Kawabata Paragraph 27).

5.   **Claims 15 and 16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawabata (US 2001/0033702 A1) in view of Givens et al. (US 5,577,181).

Regarding **claim 15**, Kawabata teaches a method of increasing resolution in a camera using a single region of comparison (congruent with claim 1), comprising:

providing a first image having a plurality of pixels; b) ascertaining first pixel locations in said first image for an image point (Kawabata Figure 7 Step 706, "Select Pixel Region (A) From First File");

ascertaining corresponding second pixel locations in a second image for said image point (Kawabata Figure 7 Step 708, "Select Pixel Region (C) From Second File");

determining pixel region locations for said image point (Kawabata Figure 7 steps

710-736 aligns the image based on the two image points; and Figure 11 demonstrates

subpixel alignment),

Kawabata does not teach using multiple comparison points to align two images.

Givens teaches a similar method using a plurality of image points in each image

and distance information between said points, comprising:

determining first ranges for location relationships among the plurality of

identifiable image points based at least in part on the first pixel locations (Givens Figure

5 Step 48, "Select search and window regions", from which tiepoints are determined);

determining second ranges for location relationships among the plurality of

identifiable image points based at least in part on the second pixel locations; combining

said first and second ranges into third ranges; (Givens Figure 5, step 62, "Map tiepoints

to next image pair" uses the same search window established in step 48);

dividing at least some of said plurality of pixels in said first image into a plurality

of pixel regions (Givens Figure 5 Step 19, "Select 9 subregions" has already subdivided

the search window).

It would have been obvious at the time of invention to one of ordinary skill in the

art to provide the image registration method of Kawabata with the multiple tiepoint

selection technique of Givens to acquire tiepoints "invariant with respect to the scale,

orientation, and position of the image of which the points are a part" (Givens Column 1

Line 22) which leads to a more robust image registration than Kawabata's method alone

(which assumes that the two images have been acquired with the same camera,

however the method is clearly extendable to using multiple image acquisition devices

using Given's robust tiepoint selection method).

Regarding **claim 16**, Kawabata and Givens are not limited to only 2 input images

("the plurality of images", Givens Column1 Line 17).

Regarding **claim 17**, Kawabata and Givens teach location ranges including

separations distances (Givens Figure 5 Step 48, "Select search and window regions"

gives a separation distance criterion).

Regarding **claim 18**, Kawabata and Givens teach using angles as a location

relationship between tie points ("calculate the distances between the candidate tie

points forming the triangles, the consensus check 130 processes the ranked candidate

tie points and direction cosines in all stereo pairings of interest", Givens Column 8 Line

12).

Regarding **claim 19**, Kawabata and Givens teach a third range being less than

the first two ("two standard deviations are equal and the third standard deviation is less",

Givens Column 9 Line 3)

Regarding **claim 20**, Kawabata and Givens teach subdividing into 9 subregions

(Givens Figure 5 Step 19, "Select 9 subregions").

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jared W. Radkiewicz whose telephone number is (571) 270-1577. The examiner can normally be reached on 8:00 - 5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian P. Werner can be reached on (571) 272-7401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JWR

BRIAN WERNER
SUPERVISORY PATENT EXAMINER